

# Phoenix Biotechnology, Inc. - Toxicity

## What does it mean to be toxic in terms of Oleander?

Oleandrin is a molecule found within a plant called Nerium oleander. While the whole plant itself could be toxic if consumed, the molecule oleandrin is a small subset of it and it would take a very large quantity of the compound for negative effects to occur. In this respect it is like everyday compounds that could also be described as “poisons” such as alcohol, nutmeg, peppermint or menthol.

### Background

Oleandrin is a lipid-soluble cardiac glycoside found in the plant Nerium oleander also known as common, white or pink oleander. N. oleander is an evergreen shrub or small tree with a wide geographical and ecological distribution. Leaves are leathery and dark green to grey green. Flowers are in clusters at the tip of the stem and range in color from white to pink to deep red. Seeds and roots of N. oleander contain the highest measurable levels of total cardiac glycosides while the leaves were shown to contain the highest concentrations of oleandrin. Is the Nerium oleander plant toxic? Yes, if you eat the plant directly, it has been shown that 4-15 leaves (depending on the Nerium varietal), then you will receive a toxic dose. If you eat enough of the plant, symptoms include skin rash, blurred vision, diarrhea, nausea, vomiting, irregular heartbeat, weakness or lethargy. However, you never would want to eat the plant directly. The plant is extremely bitter and contains many other compounds that will make you feel sick. Nerium oleander is not to be confused with Thevetia peruviana, an extremely poisonous plant commonly known as Yellow oleander.

We have tested several different varieties of Nerium oleander and have found that the average leaf weighs about 900 mg (0.032 ounces) and contains between 800 – 1300 micrograms (0.000028 ounces) of oleandrin.

Nerium Oleander varietal	Oleandrin (ug/g)	Oleandrin in 4 leaves (ug)
Album (White)	~1,350	4,860
Petit Salmon (pink)	~1,140	4,104
True pale Pink (light pink)	~1,060	3,816
Pink Beauty (medium pink)	~1,350	4,860
Calypso (dark pink)	~1,170	4,212
Red Hardy	~810	2,916

The proposed product provides a defined serving of oleandrin as a proprietary extract of the whole leaf of Nerium oleander. This product has a concentration of 13 micrograms per milliliter (0.00000046 ounces of oleandrin per 0.03 ounces) in MCT oil derived from coconuts. One serving is therefore approximately 0.016 leaves (1/62 of a leaf).

# Toxicity Discussion

Many everyday foods and compounds can be considered toxic if over-consumed.

Let's consider Nutmeg, as a comparative example:

The spice nutmeg is used in many drinks and desserts. In fact, you may have had it in your breakfast or in your coffee drink today. **However, nutmeg is an extremely toxic spice. It is typically used as a ¼ teaspoon per serving. Only about 15-20 servings of nutmeg are enough to be toxic and make you feel sick.**

Our oleandrin compound is not toxic unless consumed in extremely large quantities

To put this in perspective, **one would need to take approximately 600-900 servings of our product in order to reach a toxic level.** That is approximately 300-450 ml of MCT oil, which is nearly a pint. When was the last time you mistakenly drank an entire pint of oil?

By the way, **a pint of our product would be about 30 vials**, which only comes in a 15 ml size. The product is flavored and the MCT oil, which conceals any of the bitterness found in the extract. Let's talk briefly about MCT oil. MCT (Medium Chain Triglyceride) oil is derived from coconuts. It is nearly impossible for the human body to take, and, keep down a full pint of MCT oil in one dose. Severe gastrointestinal distress will occur if you were to take that much MCT oil.

In fact, **who gulps down pints of anything except water, milk or perhaps even a beer?** Beer has a relatively low alcohol content of typically around 4%, which is one of the reasons it is even possible to drink pints of it. Vodka, in contrast, has an alcohol content ten times higher, i.e. 40%. It's extremely difficult and dangerous to consume a pint of vodka in one sitting (that would be about 8-12 shots). Not many people could do so without serious consequences. **There are plenty of things it is inadvisable to consume by the pint or in vast quantities.**

**The point is that our product is very safe and intentionally formulated.**

- We use a low dose of the botanical extract that is “dialed-in” to be effective, taking into account the beneficial nature of the extract.
- The MCT oil, which has its own natural benefits, is essentially its own ‘child safety lock’ to prevent any accidental overdose.
- We provide enough of the product so that it could be used as either a preventative (twice daily) or as an effective means way to supplement the body's natural defenses and immune system.